

Appl. No. : **10/555,728**
Filing date : **January 6, 2006**

REMARKS

Claims 1, 2, 16 and 21 have been amended. New claims 26-33 have been added. Thus, Claims 1-33 are presented for examination.

Support for the amendment to claim 1 may be found in the published application at paragraphs [0044] and [0063].

Support for new claim 26 may be found in original claim 1 and in paragraph [0063].

Support for new claim 27 may be found in paragraphs [0052]-[0063], which explains the operation of the selector assembly with reference to Figures 5a - 5f. In paragraph [0052] the second bar set moves into engagement with the first gear wheel 3 (see Figure 5b), which locks the first gear wheel 3 for rotation with the first shaft 1 in a clockwise direction but it is unlocked in a counter-clockwise direction, since the ramps 45 on the engagement bars prevent the engagement bars from drivingly engaging the dogs 19 in the counter-clockwise direction (see Figure 2, reference number 45 and paragraph [0043]). The effect of the ramps 45 when they contact the dogs 19 is to move the engagement bars axially along the shaft away from the gear against the action of the disc spring, thereby allowing engagement bars to slide over the dogs 19. When the engagement bars have moved passed the dogs the biasing of the disc spring pushes the engagement bars back along the shaft towards the gear wheel. If there continues to be relative rotational movement between the gear and the engagement bars in the counter-clockwise direction, each time the bars they hit the dogs 19, the ramps 45 force them out of engagement. Thus the gear wheel is not locked for rotation in that direction. Figure 5c shows first and second sets of engagement bars 27,29 engaging with the first gear wheel 3, which locks the first gear wheel for rotation with the first shaft in the counter-clockwise direction and the clockwise directions. When the first set of engagement members 27 engages the first gear wheel 3 without the second set of engagement members 29, the first gear wheel 3 is locked for rotation with the shaft 1 in a counter-clockwise direction and is not locked for rotation with the drive shaft in a clockwise direction, due to the ramped faces 45 since these prevent driving engagement with the dogs 20.

Support for new claim 28 may be found in Figure 5a.

Support for new claim 29 may be found in Figures 5d and 5e, and at paragraphs [0056] and [0062].

Appl. No. : 10/555,728
Filing date : January 6, 2006

Support for new claims 30-33 may be found in original claims 1 and 2, and in paragraph [0063]. Thus, since no new matter has been added, consideration and entry of these amendments are respectfully requested.

Reconsideration and withdrawal of the present objections and rejections in view of the amendments and comments presented herein are respectfully requested.

Claim objections

Claims 2, 16 and 21 were objected to based on several informalities. Claim 2 as amended recites --wherein the selector-- rather than "wherein selector", and --the first set-- rather than "the second set." Claim 16 as amended recites --set of engagement-- rather than "set engagement." Claim 21 as amended recites --resiliently deformable-- rather than "radiantly deformable."

In view of the claim amendments discussed above, Applicant respectfully requests reconsideration and withdrawal of the claim objections.

Rejection under 35 U.S.C. §102(b)

Claims 1-5, 7-13, 14-19 and 21-23 were rejected under 35 U.S.C. §102(b) as being anticipated by US 3,780,840 to Thomas ("Thomas '840").

In order for a claim to be anticipated by a reference, each claim element must be disclosed by the reference. Claim 1 as amended, as well as new independent claims 26, 27 and 33, recite the feature of brief torque interruption when performing kickdown shifts. This feature is not disclosed or suggested by Thomas '840.

In addition, claim 1 specifies that "...the actuator assembly is arranged to move the unloaded set of engagement members into driving engagement with the unengaged gear wheel to effect a gear change before the loaded set disengages the engaged gear wheel when performing accelerating upshifts and decelerating downshifts...", which is not disclosed or suggested by Thomas '840.

Claims 27 and 33 include the feature that the selector assembly is arranged to select from the following operational modes for the first and second gear wheels: lock the gear wheel for rotation with the first shaft in a clockwise direction and not lock in a counter-clockwise direction; lock the gear wheel for rotation with the first shaft in the counter-clockwise direction and not lock in the clockwise direction; and lock the gear wheel for rotation with the first shaft in the clockwise and counter-clockwise directions. The transmission in US 3,780,840 cannot lock each

Appl. No. : 10/555,728
Filing date : January 6, 2006

of the first and second gear wheels in both of the following modes: "lock the gear wheel for rotation with the first shaft in a clockwise direction and not lock in a counter-clockwise direction; lock the gear wheel for rotation with the first shaft in the counter-clockwise direction and not lock in the clockwise direction"; it can only perform one of those modes for each gear wheel as it always engages the unengaged gear wheel with connector elements 61 and not stop members 43. Thus, the transmission of Thomas '840 is unable to perform downshifts.

In view of the amendments and comments presented above, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b).

Rejections under 35 U.S.C. §103(a)

Claims 6 and 24 were rejected under 35 U.S.C. §103(a) as being obvious over Thomas '840 alone. Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Thomas '840 in view of US 4,098,380 to Thomas ("Thomas '380"). Finally, Claim 20 was rejected under 35 U.S.C. §103(a) as being unpatentable over Thomas '840 in view of Thomas '380, and further in view of US 7,261,379 to Volker.

A. The Volker patent does not qualify as prior art to the present application.

Applicants note that the Volker patent is based on a U.S. Application filed September 5, 2003. The present application claims priority to a GB Patent Application filed May 7, 2003, which was prior to the filing date of the Volker patent. Thus, the Volker patent does not qualify as prior art against the present application, thereby overcoming the rejection of claim 20. Thus, the following comments presented below refer only to the two Thomas patents.

B. The claimed transmission enables kickdown shifts.

The claimed transmission enables selection of a new gear while the current gear is still engaged, thereby enabling shifts to be made without loss of power for at least accelerating upshifts and decelerating downshifts. It has been estimated by the inventor that this type of transmission increases fuel efficiency alone by around 5% because there is no loss of drive during accelerating upshifts and decelerating downshifts when compared with conventional automatic transmissions. This can make a significant impact on the greenhouse gases emitted by vehicles. However, as explained below, the claimed transmission requires an additional intervention to perform accelerating downshifts, also known as "passing gear" or kickdown

Appl. No. : 10/555,728
Filing date : January 6, 2006

shifts, because of the relative geometry of the gear wheels and their resulting relative rotational speeds.

It is important for a transmission system in an on-road vehicle to be able to make kickdown shifts as such shifts are required under many circumstances. For example, when a vehicle is travelling up a hill when the current gear is too high to increase the speed of the vehicle, a kickdown shift is necessary for acceleration to occur. Thus, a transmission that cannot perform kickdown shifts would not be suitable for use in road vehicles. As a result, the increased performance and efficiency of the claimed transmission cannot be obtained in on-road vehicles without some form of intervention to permit the performance of kickdown shifts.

When performing accelerating upshifts and decelerating downshifts, the unloaded set of engagement members is moved into engagement with the new gear wheel while the loaded set is still engaged. The relative geometries of the current gear and the new gear are such that the newly selected gear wheel overdrives the currently engaged gear wheel for those shift types. When this happens, the pressure on the engagement members in driving engagement with the current gear is released, which enables that set of engagement members to disengage the current gear wheel and move across to engage the new wheel to complete the shift. This is not the case for kickdown shifts. The relative geometries of the higher and lower gears are such that when performing accelerating downshifts the lower gear is unable to overdrive the higher gear and therefore the loaded set of engagement members cannot disengage the current gear and move across to complete the shift.

The inventor of the present application has discovered that this is an inherent problem for transmissions of the type that are arranged to select a new gear while the current gear is still engaged and has provided a solution to overcome this problem. Specifically, the Applicant has discovered that employing the recited brief torque interruption recited in the transmission system of the present claims enables kickdown shifts to be performed. Accordingly, the present invention has provided a valuable contribution to the art because it provides a transmission that obtains the significant benefits of selecting a new gear while the current gear is still engaged, while still enabling kickdown shifts to be made.

Appl. No. : 10/555,728
Filing date : January 6, 2006

C. Thomas '840 can only perform accelerating upshifts.

The transmission described in Thomas '840 can only perform accelerating upshifts. It is not able to perform any type of downshift. When the fourth gear (final gear) has been selected, it is necessary to disengage the selector rings and reset the transmission (see column 7, lines 42 to 49). This is the case because each time a shift is made, the connector elements 59 on the gear wheels are always engaged by the connector elements 61 on the gear selector elements 33,34,36,37, which are arranged to drive the gears only in the accelerating direction (for example, see column 6, line 36 to column 7 line 19). This patent does not disclose downshifts or the ability to make downshifts, since there are no true driving elements for driving in the deceleration direction. In fact, the transmission of Thomas '840 includes elongated stop members 43 which limit relative rearward movement of the connector elements 59 when engaged by the connector elements 61 (see column 3 line 52 and column 5 line 61). That is, they are not designed to be moved to make the initial engagement with a new gear wheel, but merely follow the connector elements 61 and hold the connector elements 59 in engagement with the connector elements 61. This is further confirmed by the design of the shock absorber (compression spring 54, see 56 and column 4 lines 35 - 42). These springs are arranged to absorb loads in only one direction. This is entirely consistent with a transmission not being able to perform downshifts. Accordingly, there is no reason to modify the transmission system of Thomas '840 to perform kickdown shifts to arrive at the claimed invention since it is not able to perform any type of downshift.

D. Thomas '380 does not remedy the deficiencies in the teachings of Thomas '840.

Thomas '380 relates to a different type of engagement system. The clutch rings 34 disengage the clutch dogs 40 from the associated shaft 6 prior to engaging a new gear wheel (see column 4 lines 36 - 44). This is apparent from the figures that the first set of engagement members can only engage the first gear wheel 4 and the second set of engagement members can only engage the second gear wheel 10. This reference also does not teach or suggest the brief torque interruption in the transmission system recited in the present claims to enable kickdown shifts to be performed. Thus, even if this reference were combined with Thomas '840, it adds nothing that would remedy the deficiency in its teachings. Accordingly, the combination of the two Thomas references simply would not produce the claimed invention. As such, the combination fails to support a *prima facie* showing of obviousness.

Appl. No. : 10/555,728
Filing date : January 6, 2006

E. The claimed invention is nonobvious.

In summary, since the cited references, either alone or in combination, do not teach or suggest interrupting torque in a transmission prior to performing a kickdown shift, the present claims cannot be obvious over these references.

In view of the amendments and comments presented above, Applicant respectfully requests reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a).

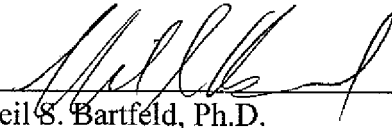
CONCLUSION

Applicant submits that all claims are in condition for allowance. However, if minor matters remain, the Examiner is invited to contact the undersigned at the telephone number provided below. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: 5/8/08

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